BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 09-137
	)	
	)	

To: The Commission

SOUTHERN COMPANY SERVICES, INC: COMMENTS – NBP PUBLIC NOTICE #2

By:

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To: The Commission

SOUTHERN COMPANY SERVICES, INC:
COMMENTS – NBP PUBLIC NOTICE #2

Southern Company Services, Inc. ("Southern"), on behalf of itself and its operating affiliates, hereby submits its comments in response to the Federal Communications Commission's Public Notice on the implementation of Smart Grid Technology.[1]

Southern applauds the Commission for recognizing the vital role of utility communications in meeting the important national interest in the secure, reliable, and efficient delivery of energy services to the American public and is pleased to provide the following

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[1] / Comment Sought on the Implementation of Smart Grid Technology, NBP Public Notice #2, GN Docket Nos. 09-47, 09-51, 09-137, Public Notice, DA 09-2017 (rel. Sept. 4, 2009) ("Public Notice").

comments. Southern previously filed comments and reply comments in response to the Commission's *Notice of Inquiry* on the development of a national broadband plan[2] and respectfully refers the Commission to these filings as well, which are incorporated herein by reference.

I. INTRODUCTION

Southern Company Services, Inc. is a wholly-owned subsidiary service company of Southern Company, a super-regional energy company in the Southeast United States. Southern Company also owns four electric utility subsidiaries – Alabama Power Company, Georgia Power Company, Gulf Power Company, and Mississippi Power Company – which provide retail and wholesale electric service throughout a 120,000 square mile service territory in Georgia, most of Alabama, and parts of Florida and Mississippi. Members of the Southern Company family use a variety of communications technologies, including FCC licensed radio spectrum, to support the safe and efficient delivery of energy services to their customers.

II. GENERAL COMMENTS

The Commission's Public Notice requests very specific and detailed information regarding utility implementation of Smart Grid technology. Although it has done its best to respond to the Commission's request as completely and comprehensively as possible in the time allotted, Southern would like to clarify for the Commission that Smart Grid is still a very new and evolving concept and as yet there are no clear answers to many of the Commission's questions. While the promises and potential of Smart Grid have prompted numerous manufacturers, vendors, and service providers to file comments, make presentations, and launch

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[2] / *A National Broadband Plan for Our Future*, GN Docket No. 09-51, Notice of Inquiry, FCC 09-31 (rel. April 8, 2009) ("*Broadband NOI*"). Southern filed comments in GN Docket No. 09-51 on June 8, 2009, and filed reply comments in that docket on July 21, 2009.

public marketing campaigns regarding their visions for Smart Grid, at this point these are all still just *visions*.

The reality is that utilities across the nation are still working on their Smart Grid plans, which is an extraordinarily complex process with significant ramifications. The architecture and needs of each utility's grid are, by necessity, unique – there is no "one-size-fits-all" solution. In addition to the mind-boggling variety of possible technologies and solutions, utilities must also consider factors such as (i) compatibility with existing systems; (ii) ability to expand or adapt the system to accommodate future needs; and (iii) compliance with any mandatory standards that may be adopted. If a utility should guess wrong with any of these factors (and at this point it is still very much a guess), it risks having an enormous stranded investment. It is therefore even more essential that all options be kept open at this time with respect to Smart Grid and that any potential technologies, opportunities, or solutions not be foreclosed prematurely.

For example, and as discussed below in these comments, utilities already face significant spectrum constraints even as their need for spectrum is rapidly increasing. Additional spectrum is therefore needed to expand or augment the capabilities of existing systems and facilitate the implementation of Smart Grid and other critical utility communications needs. However, any new spectrum made available to utilities should be in addition to – not a replacement for – existing spectrum currently used by utilities, and the use of this new spectrum should be optional, not mandatory.

Finally, while Smart Grid would certainly benefit from ubiquitous broadband deployment, it is not dependent on it. As stated above, there is no "one-size-fits-all" solution to Smart Grid, and utilities must be afforded the freedom and flexibility to select the technologies and platforms – be they broadband, narrowband, or some combination of the two – that are best suited for their particular grid architectures, operating environments, and Smart Grid deployments. Any action that has the legal or practical effect of mandating rather than facilitating the use of broadband for Smart Grid would severely restrict this vital flexibility, thus substantially raising the costs of further modernizing the nation's electric infrastructure and significantly delaying Smart Grid deployment. Therefore, while Southern urges the Commission to make every effort to promote broadband as a viable option for Smart Grid implementation, the Commission must also take care not to make one dependent on the other.

III. RESPONSES TO THE COMMISSION'S REQUEST FOR COMMENTS ON THE IMPLEMENTATION OF SMART GRID TECHNOLOGY

1. Suitable Technologies

- **What are the specific network requirements for each application in the grid (*e.g.*, latency, bandwidth, reliability, coverage, others)? If these differ by application, how do they differ?**

Each of the network requirements mentioned by the Commission in the Public Notice – latency, bandwidth, reliability, and coverage – are essential requirements for the communications services and applications utilities depend on for the safe, reliable, and efficient operation of the electric grid.

Low latency levels are especially vital for critical command and control applications such as load management, protective relaying, and supervisory control and data acquisition (SCADA) systems.[3] Southern's operating affiliates generally require latency levels of less than 100

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[3] / As described by the National Telecommunications and Information Administration (NTIA): "SCADA systems are generally computer-controlled radio communications links that allow a user to control and monitor power generation, storage and distribution systems without having to deploy staff where the equipment is located … As modern utility systems have increased in complexity, SCADA systems have become critical components of their command and control infrastructure. These systems help to automate tasks like opening and closing circuit breakers, monitoring system reliability, and monitoring alarms for overload conditions." Marshall W. Ross and Jeng F. Mao, *Current and Future Spectrum Use by the Energy, Water,*

milliseconds for these command and control applications, with any increase in latency to 250 milliseconds or greater considered unacceptable. With respect to advanced metering infrastructure (AMI), latency is less of an issue for basic applications such as one-way transmission of metering data to a data collection point and the backhaul of that data to the utility. However, low latency becomes a much more important requirement as more advanced *two-way* AMI communications applications are deployed – such as those that enable consumers to take advantage of demand-response, time-of-use pricing, and other innovations – due to the need for real-time, instantaneous two-way communication between the utility and potentially hundreds of thousands of consumers.

Bandwidth is generally less of an issue today for command and control applications, except to the extent the amount of bandwidth available affects other network requirements such as latency or reliability. Bandwidth is much more important, however, for data collection applications, especially when it is necessary to transmit large amounts of data aggregated from various points on the grid, including substations, capacitor banks, transformers, or hundreds of thousands of customer premises meters.

Perhaps the most important network requirements for utility communications applications are reliability and coverage. In order to maintain the levels of service, safety, and reliability needed by the public – and increasingly mandated by federal and state regulators – utility

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and Railroad Industries, U.S. Department of Commerce, National Telecommunications and Information Administration, Jan. 2002, at 3-10.

Southern's SCADA system enables its operating companies to monitor transmission and distribution operations in real time; quickly identify potential or actual problems (such as outages); adjust voltages and deenergize lines to efficiently manage load levels, prevent or contain outages, and ensure the safety of the public (*e.g.*, from downed lines, etc.); and collect and transmit voluminous amounts of data between remote facilities and headquarters, thus increasing the efficiency of field inspection and maintenance operations and ensuring the integrity of the power grid.

communications systems (including those that support Smart Grid applications) must work twenty-four hours a day, seven days a week, 365 days a year at a standard of reliability of 99.999 percent to meet America's "everyday" needs, and especially during service outages, natural or man-made disasters, or other emergency situations.[4] Electric utilities are now subject to mandatory reliability standards adopted and enforced by the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC) pursuant to the Energy Policy Act of 2005. These standards require electric utilities to have reliable communications for operational control and management of the electric grid, including wireless communications systems that enable monitoring, control, protective relaying, and other essential functions throughout the entire grid. Not coincidentally, these same communications applications are also key elements of the Smart Grid.

Reliability also requires that utility communications systems be *instantaneously available* at any time to handle large amounts of traffic, such as during or following major emergencies when major repair or restoration of critical utility service and infrastructure must be carried out as quickly as possible while any damages or danger to the public from power surges, downed power lines, etc., are minimized. This instantaneous availability is thus especially critical for Smart Grid command and control applications.

Finally, the coverage of any Smart Grid application must extend to every point of the utility's system where it is required. For AMI applications, this means that coverage must

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[4] / The Commission recognized back in 1985 that utilities' communications needs "tend to demand a reliability factor of 99.995 percent" – a factor that has increased with the introduction of new mandatory reliability standards at both the federal and state levels, as well as the increasing automation of grid operations and the deployment of Smart Grid applications. *See Amendment of Part 94 of the Commission's Rules to Authorize Private Carrier Systems in the Private Operational Fixed Microwave Service*, PR Docket No. 83-426, First Report and Order, 57 Rad. Reg. 2d (P&F) 1486, ¶ 53 (1985).

extend to every customer meter, including those in rural and remote areas. For command and control applications, coverage must extend to every place where the utility has infrastructure, including to substations and transmission or distribution lines that are located in or traverse isolated, hard-to-reach areas.

- **Are current commercial communications networks adequate for deploying Smart Grid applications? If not, what are specific examples of the ways in which current networks are inadequate? How could current networks be improved to make them adequate, and at what cost? If this adequacy varies by application, why does it vary and in what way?**

A Smart Grid "system" actually consists of a mix of different components, functions, and applications. For certain non-critical functions and applications, commercial networks are adequate. For example, AMI backhaul (*i.e.*, transporting meter data back to the utility) is an application that is less dependent on reliability and network availability, and Southern currently utilizes a virtual private network over a commercial cellular network as a cost-effective means of fulfilling this communications need. In conjunction with this commercial backhaul service, Southern utilizes a private last-mile link between the customer premises meter and the point where the data is collected for backhaul because: (1) there is no commercial network coverage (or insufficient coverage) where many meters are located; and (2) capacity on the commercial network is not always available due to issues such as network congestion, and Southern's equipment can store the meter data while waiting for capacity on the commercial network to become available.

However, as discussed in more detail below, reliability and coverage are frequently a problem for commercial networks, thus making them generally unsuitable for other Smart Grid applications, and especially unsuitable for critical command and control communications. Moreover, Southern believes that the costs of improving the reliability and coverage of commercial networks to the levels required for critical utility communications would be too high to justify the necessary level of investment by commercial carriers.[5]

- **How reliable are commercial wireless networks for carrying Smart Grid data (both in last-mile and backhaul applications)? Are commercial wireless networks suitable for critical electricity equipment control communications? How reliably can commercial wireless networks transmit Smart Grid data during and after emergency events? What could be done to make commercial wireless networks more reliable for Smart Grid applications during such events?**

In Southern's experience, reliability is a major limiting factor in using commercial wireless networks. First, when utility communications are carried over a commercial wireless network, they are subject to the same quality of service levels – and issues – as any other communications traffic being carried over the commercial carrier's network.[6] These issues include network congestion and cellsite outages that can degrade the quality of the communications service or even make service entirely unavailable. These problems create an inconvenience for most consumers through dropped calls, long call set-up times, poor sound quality, or long upload/download times for data applications. For utility communications, however, such problems are more than inconvenient – they are potentially disruptive: dropped signals can result in lost data, and command and control signals that are dropped or subject to increased latency can effectively cripple a utility's ability to address grid conditions that require

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[5] / The high level of investment necessary by commercial carriers would also effectively divert these carriers' resources from their core commercial communications operations to the detriment of broadband consumers. These are the same reasons why public safety agencies generally do not rely on commercial carriers for their critical communications services.

[6] / In general, utility communications do not receive any priority over any other traffic on a commercial wireless network, nor do commercial service providers have any incentive to give any priority to utility communications over the communications of their more lucrative commercial service customers. Moreover, to the extent the Commission should decide to impose "net neutrality" mandates on wireless networks, commercial service providers may be prohibited from giving any priority to utility communications.

a response measured in milliseconds. Moreover, for utility personnel working on or near energized lines and often times in high noise environments (due to large electrical equipment), voice quality is critical.

These problems with network congestion, latency, and overall quality of service are likely to get worse before they get better due to the rapidly increasing demands being placed on commercial wireless networks by "smart phones" and other data-hungry devices, which are already causing network problems in many cities as a result of their success. Overall, while commercial service providers have made significant improvements in the levels of quality and reliability of their networks, they still fall well short of the levels of quality and reliability necessary for critical utility operations.

Commercial networks are also not generally designed or built to provide the levels of reliability, survivability, availability, and coverage that are necessary to meet critical utility communications needs, particularly during times of emergency.[7] For example, when Hurricane Katrina slammed into the Gulf Coast region in 2005, the communications systems operated by Southern Company subsidiaries Mississippi Power and SouthernLINC Wireless were for a time the sole source of wireless communications in Gulfport, Mississippi and along much of the Mississippi coast. When the Commission's Independent Katrina Panel presented its report and recommendations to the Commission, the Panel made the following observations regarding utility communications networks:

> Electric utility networks (including utility-owned commercial wireless networks) appeared to have a high rate of survivability following Katrina. These

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[7] / Although Southern's affiliated operating utilities rely on a commercial provider – SouthernLINC Wireless – for land mobile service, SouthernLINC Wireless is a wholly-owned subsidiary of Southern Company and has designed and built its system to meet the rigorous standards of a utility or public safety system.

> communications systems did not have a significant rate of failure because: (1) the systems were designed to remain intact to aid restoration of electric service following a significant storm event; (2) they were built with significant onsite back-up power supplies (batteries and generators); (3) last mile connections to tower sites and the backbone transport are typically owned by the utility and have redundant paths (both T1 and microwave); and (4) the staff responsible for the communications network have a focus on continuing maintenance of network elements (for example, exercising standby generators on a routine basis).[8]

Although the Panel made several recommendations for improving the survivability and reliability of commercial wireless services during and after emergency events such as Hurricane Katrina, these recommendations have yet to be implemented.[9] Commercial wireless networks therefore remain largely dependent on the restoration of electric utility service, and the restoration of electric utility service is dependent on functioning utility communications systems. The reliability and survivability of commercial networks – especially during times of emergency when commercial networks are likely to be overloaded and/or suffering from inoperable infrastructure – therefore make commercial wireless networks unsuitable for critical utility command and control applications.

Finally, for reasons of operational reliability and system security, it is essential for utilities to maintain direct control over their communications systems. As previously discussed in these comments, utilities are subject to mandatory reliability and security requirements established and enforced by FERC and NERC and cannot afford to hand over liability for their communications reliability to third parties. Moreover, the use of any third party communications

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[8] / Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks: Report and Recommendations to the Federal Communications Commission, June 12, 2006 at 12-13.

[9] / In fact, when the FCC attempted to act on the Katrina Panel's recommendations by requiring commercial wireless carriers to adopt measures intended to improve their networks' reliability during storms and other disasters, the commercial carriers fought vigorously against these measures.

network or service effectively introduces additional "points of entry" into a utility's communications system that could be exploited by a cyberattack against the utility's system or infrastructure.

2. Availability of Communications Networks

- **What percentage of electric substations, other key control infrastructure, and potential Smart Grid communications nodes have no access to suitable communications networks? What constitutes suitable communications networks for different types of control infrastructure?**

For command and control purposes, Southern continues to find ways to communicate with key components of its existing infrastructure. However, the communications networks currently available to Southern are almost entirely narrowband, and none of its substations or other key infrastructure elements have access to broadband communications that would allow for the transmission of the amounts of data necessary for more sophisticated applications (*e.g.*, video surveillance, more detailed real-time data on loads and line conditions, etc.). In many cases, Southern's private communications network covers territory where there is no commercial signal to be found.

3. Spectrum

- **How widely used is <u>licensed</u> spectrum for Smart Grid applications (utility-owned, leased, or vendor-operated)? For which applications is this spectrum used?**

Licensed spectrum is widely used in Southern's communications systems for most communications and Smart Grid applications, although nearly all of this spectrum (with the exception of point-to-point microwave backhaul) is still narrowband. In particular, Southern uses licensed spectrum (or, in some cases, fiber) for most of its backhaul and command and control applications. Southern also relies extensively on licensed spectrum for its AMI applications. This licensed spectrum includes frequencies in the 450 MHz and 900 MHz bands, as well as 800 MHz SMR frequencies used by Southern's commercial carrier affiliate, SouthernLINC Wireless (a wholly-owned subsidiary of Southern Company).

- **How widely used is <u>unlicensed</u> spectrum? For which applications is this spectrum used?**

Southern does use some unlicensed spectrum for last-mile solutions in certain circumstances, particularly for some point-to-point microwave links. As an example, in some cases Southern will establish a last-mile link using unlicensed spectrum to allow a capacitor bank to communicate through an MAS remote to an MAS master station that might otherwise be blocked by terrain or foliage. However, Southern tries to minimize its use of unlicensed spectrum due to interference concerns.

- **Have wireless Smart Grid applications using unlicensed spectrum encountered interference problems? If so, what are the nature, frequency, and potential impact of these problems, and how have they been resolved?**

Not only has Southern experienced interference problems in unlicensed spectrum bands, but Southern has also experienced interference to its *licensed* spectrum caused by unlicensed operations. For example, in one recent case involving interference to its licensed operations, Southern ultimately traced the source of interference to a malfunctioning baby monitor. When these interference problems arise, they knock out Southern's communications link, which could potentially affect the safety and reliability of portions of the electric grid until the interference issue can be resolved. For this reason, Southern strongly cautions the Commission that many new and proposed "unlicensed" technologies that have been discussed in this docket have not yet been proven under real-world operating conditions, and the deployment of such technologies could compromise the viability of existing services, including critical utility communications and applications.

- **What techniques have been successfully used to overcome interference problems, particularly in unlicensed bands?**

Southern has utilized a variety of filtering and engineering solutions in response to interference problems, but this is really only effective when there is sufficient information available regarding the source and nature of the interference. In most cases, someone must actually go out to the field and track down the source of interference, which can often take days. Meanwhile, until the source of interference is found, the affected communications link is effectively rendered inoperable.

- **Are current spectrum bands currently used by power utilities enough to meet the needs of Smart Grid communications?**

As Southern explained in its earlier filings in the Commission's *Broadband NOI* docket, the spectrum bands currently relied on for critical utility operations are increasingly congested and scarce, and narrow bandwidths and the technical and operational rules for some of these bands render them inadequate for current and future utility sector needs.[10] Not only are utilities effectively relegated to a total of about 30 MHz for their internal communications systems, but this same 30 MHz is also utilized by hundreds of thousands of small, medium, and large business enterprises from all sectors of the economy. As a result, very little of this spectrum remains available for licensing by utilities. For example, within Southern Company's service territory, no more suitable spectrum remains available for licensing in Georgia, and the amount of available licensed spectrum in Alabama is nearing exhaustion.

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[10] / Reply Comments of Southern Communications Services, Inc. in GN Docket No. 09-51 at 13 – 14; *See also* Reply Comments of Entergy Services, Inc. in GN Docket No. 09-51 (filed July 21, 2009) at 8, *and* Reply Comments of PacifiCorp and MidAmerican Energy Company in GN Docket No. 09-51 (filed July 21, 2009) at 6-7.

Moreover, this 30 MHz of spectrum is scattered across several bands – including 6.95 MHz in the VHF band, 11.85 MHz in the UHF band, 6 MHz in the 800 MHz band, and 5 MHz in the 900 MHz band – none of which provide adequate bandwidth or channel sizes for the broadband applications that utilities require to support their critical operations. In particular, most state-of-the-art broadband technology requires channels that are at least 5 MHz wide, whereas the typical land mobile voice channel is only 25 or 12.5 kHz wide – and these voice channels are being narrowed even further.

- **Is additional spectrum required for Smart Grid applications? If so, why are current wireless solutions inadequate?**

As discussed above, the amount of spectrum available to utilities today is already insufficient to meet their current communications needs, therefore additional spectrum is required. In addition to the bandwidth limitations discussed above, utilities have few, if any, practical options for obtaining needed additional spectrum.[11]

Another driver for additional spectrum and bandwidth is the fact that the amount of data that utilities would like to handle is orders of magnitude larger than what is handled today. Examples of some of the data-driven applications that will further improve the reliability and efficiency of the electric grid include:

- Real time event information (beyond command and control);
- Data on power quality (such as waveform data, etc.);
- Setting relays remotely;
- Setting regulators to make the grid more efficient;

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[11] / Reply Comments of Southern Communications Services, Inc. at 16 – 17.

- Addition of fault locators to do more intelligent switching (*i.e.*, if the system senses reverse current or no current, it would switch the power flow automatically);

- Mapping for remote locations and for pinpointing outages or other problems;

- Transmission of schematics, blueprints, and other data to crews in the field; and

- Video surveillance of substations and other critical points in order to prevent copper theft and acts of vandalism or sabotage, and to provide overall security throughout the grid.

Field engineering provides another example of the way in which the capability to handle greater amounts of data would benefit the safety, reliability, and efficiency of the electric grid. Today, field engineers take handwritten notes of changes to the power grid when they make repairs or alterations, and this data is manually entered into the utility's mapping system when the crew returns to the office. It is very important that any repairs or temporary fixes be placed in the mapping system as soon as possible so that others working on the grid have full insight into the state of the grid and can note any temporary fixes that will need to be corrected later. Ideally, the crew would be able to remotely enter this data right into the system from the field so that it would be immediately available to other crews working on the grid. While in theory commercial networks could carry this data, a substantial amount of field work occurs in remote areas where commercial carriers do not provide coverage. In addition, commercial networks are not an ideal solution when there is a disaster (and public networks are down) and crews are out making repairs.

- **<u>Coverage</u>: What current and future nodes of the Smart Grid are not and will not be in the coverage area of commercial mobile operators or of existing utility-run private networks?**

Significant portions of the electric infrastructure operated by Southern's electric utility affiliates are located in rural and remote areas where commercial mobile operators have yet to deploy 3G service – or, in some cases, have yet to deploy any service at all. These areas are not located near large population centers or major highways and are thus a very low priority for commercial mobile operators. Any deployment of advanced mobile wireless services (or any service) to these areas by commercial mobile operators will therefore likely take years, if it occurs at all.

By contrast, Southern communicates with most key components of its existing infrastructure and continues to find ways to communicate with other devices in its network, including in areas where there is no commercial signal to be found. Southern is also continuing to expand its coverage for distribution automation systems and AMI and to improve its existing coverage for these systems by adding capacity and filling in coverage "holes." However, as discussed above in these comments, these communications networks are almost entirely narrowband, and none of its substations or other key infrastructure elements have access to broadband communications that would allow for the transmission of the amounts of data necessary for more sophisticated and/or data-intensive applications.

- **<u>Throughput</u>: What is the expected throughput required by different communications nodes of the Smart Grid, today and in the future, and why will/won't commercial mobile networks and/or private utility owned networks on existing spectrum be able to support such throughputs?**

It is difficult to estimate the throughput that will be required for the various types of nodes that could form part of the Smart Grid as it evolves over time. As noted above, the devices and applications that could comprise the Smart Grid range from one-way metering devices that need to transmit short data bursts only periodically, to sophisticated command and control applications that could require the real-time collection and analysis of significant operational data and the remote control of critical system components, all with a high degree of confidence and reliability. Smart Grid can also encompass video monitoring or surveillance and the real-time delivery of system engineering information to and from field personnel to facilitate system repairs and enhance plant and worker safety.

Existing private radio networks operated by utilities are constrained by the extremely small amounts of bandwidth available for their operation; for example,12.5 kHz per channel for Multiple Address Systems currently used for utility SCADA. Utilities are restricted today in what they can do by the limited throughput of the wireless systems that can be licensed on existing private spectrum allocations. As noted above, commercial carriers have access to much larger amounts of spectrum, but they do not provide that bandwidth in all locations where the Smart Grid must be deployed, they are unlikely to extend that bandwidth just to encompass the locations needed by utilities, and they cannot guarantee the immediate availability and consistent reliability of their networks, particularly during storms and other times when the utilities have the greatest need to monitor and control their systems. Thus, the throughput potentially available from commercial networks is unlikely to meet utilities' Smart Grid requirements.

Southern urges the Commission to ensure that sufficient private spectrum is allocated for Smart Grid applications to supplement the limited spectrum currently used by utilities so that the Smart Grid will never be constrained in functionality by limitations on data throughput.

- **<u>Latency</u>: What are the maximum latency limits for communications to/from different nodes of the Smart Grid for different applications, why will/won't commercial mobile networks be able to support such requirements, and how could private utility networks address the same challenge differently?**

Please see Southern's response to Section III, Question 1.

- **<u>Security</u>: What are the major security challenges, and the relative merits and deficiencies of private utility networks versus alternative solutions provided by commercial network providers, such as VPNs? Do the security requirements and the relative merits of commercial versus private networks depend on the specific Smart Grid application? If so, how?**

Southern's primary security concern is the issues that arise from the introduction of third parties, such as commercial network providers, into the communications system it relies on for its utility operations. From a cybersecurity standpoint, the use of commercially-provided services, such as VPNs, effectively opens up new penetration points over which the utility has little or no control, particularly with respect to the switches, software, and servers used to provide the commercial service.

- **<u>Coordination</u>: Are there benefits or technical requirements to coordinate potential allocation of spectrum to the Smart Grid communications with other countries? What are they?**

The coordination of spectrum allocations for Smart Grid communications with other countries would serve to foster Smart Grid innovation and deployment and would significantly lower the potential costs of implementation. Manufacturers and developers would be better able to focus their efforts and resources while having a much larger potential market over which their costs could be spread. Coordination with Canada – such as UTC has proposed with respect to the 1800-1830 MHz band – would also facilitate interoperability, improve the overall reliability and efficiency of the North American power grid, and serve the vast needs of growing systems and increasing wireless data loads.

As Southern explained in the *Broadband NOI* proceeding, the Commission could coordinate with the National Telecommunications and Information Administration (NTIA), the Department of Energy, FERC, and other energy regulators at all levels of government to develop a spectrum-sharing arrangement between the federal government and utilities and critical infrastructure industries in the 1800-1830 MHz band – an arrangement that would have several advantages. For example, a spectrum-sharing arrangement would provide the government with certainty that this spectrum will be used to advance important national policy goals concerning energy efficiency, reliability, and security. In addition, a spectrum-sharing arrangement between federal government users and utility/CII users would serve important national security interests by keeping sensitive information about the nation's critical infrastructure out of the public domain.

If the 1800-1830 MHz band should be opened for use by utilities, however, it is essential that utility use of this spectrum band be optional, not mandatory. Utilities across the country have already made substantial capital investments in communications systems in other frequency bands in the expectation that these systems could be integrated into or work in conjunction with a Smart Grid system. If utilities should be compelled to move their operations into a different band, their existing communications systems would have to be substantially overhauled or effectively abandoned – either way, the cost to utilities and to electric ratepayers would be enormous, and the time and effort required to migrate all of their operations to a new band would delay Smart Grid deployment for years. In addition, licenses to access the 1800-1830 MHz band should be assigned in a manner that does not impose a cost burden, such as a requirement to participate in auctions or pay high user fees, that would act as a deterrent to utility use of this band.

- **If spectrum were to be allocated for Smart Grid applications, how would this impact current, announced and planned Smart Grid deployments? How many solutions would use allocated spectrum vs. current solutions? Which Smart Grid applications would likely be most impacted?**

Because Smart Grid is still such a new and evolving concept with many unanswered questions, Southern believes that is impossible to make any such predictions at this time.

IV. CONCLUSION

Communication has become an integral part of our society and our economy, and the actions and decisions of the Commission – whether in developing the national broadband plan, shaping spectrum policy, or encouraging innovation – will have significant ramifications for a broad array of important national interests and public policy priorities, including energy independence and efficiency and the safety and reliability of our nation's critical infrastructure. The Commission should therefore be commended for recognizing, through this Public Notice, the vital role of utility communications in meeting the important national interests in the secure, reliable, and efficient delivery of energy services to the American public.

Southern again urges the Commission to maintain and protect the limited amount of spectrum currently available to utilities and to make additional dedicated spectrum available for the essential communications systems necessary to support utility operations, including Smart Grid implementation, now and in the future. Southern also urges the Commission to ensure that all options are kept open with respect to Smart Grid and that any potential technologies, opportunities, or solutions not be foreclosed prematurely. In this way, the Commission can ensure that its policies and decisions advance the broader national public policy efforts envisioned by Congress and the Administration, as exemplified in Section 6001 of the Recovery Act.[12] Southern is pleased to provide these comments and looks forward to working with the Commission toward meeting these public policy goals.

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[12] / American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009) ("Recovery Act"), § 6001(k)(2)(D).

WHEREFORE, THE PREMISES CONSIDERED, Southern Company Services, Inc. respectfully requests the Commission to take action in this docket consistent with the views expressed herein.

Respectfully submitted,

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